FIG. 1

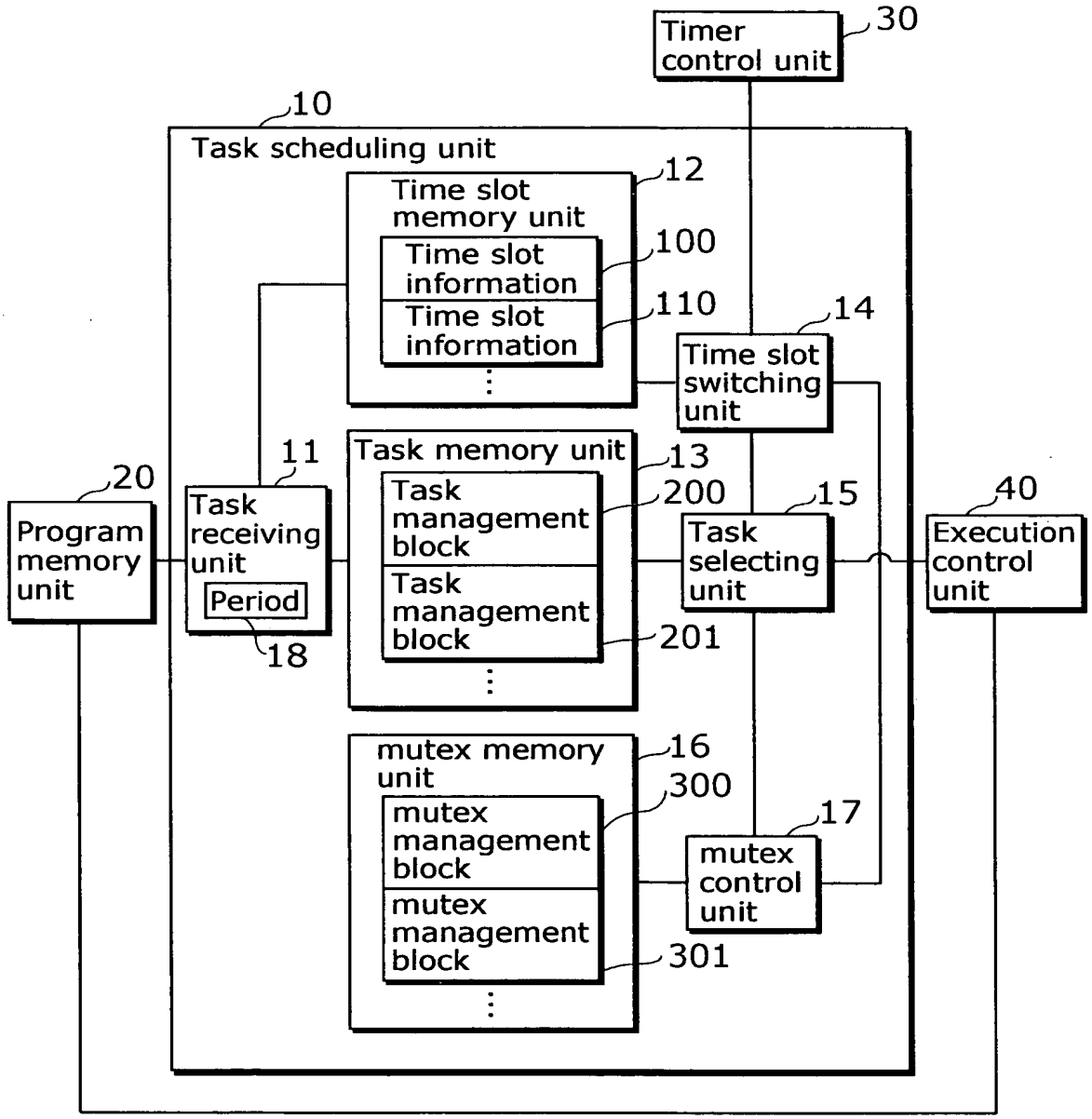

Timer control unit
30
10
Task scheduling unit
12
Time slot memory unit
100
Time slot information
110
Time slot information
14
Time slot switching unit
11
Task memory unit
13
20
Task receiving unit
Period
18
Task management block
200
15
Task selecting unit
40
Program memory unit
Execution control unit
Task management block
201
mutex memory unit
16
300
mutex management block
17
mutex control unit
mutex management block
301

FIG. 2

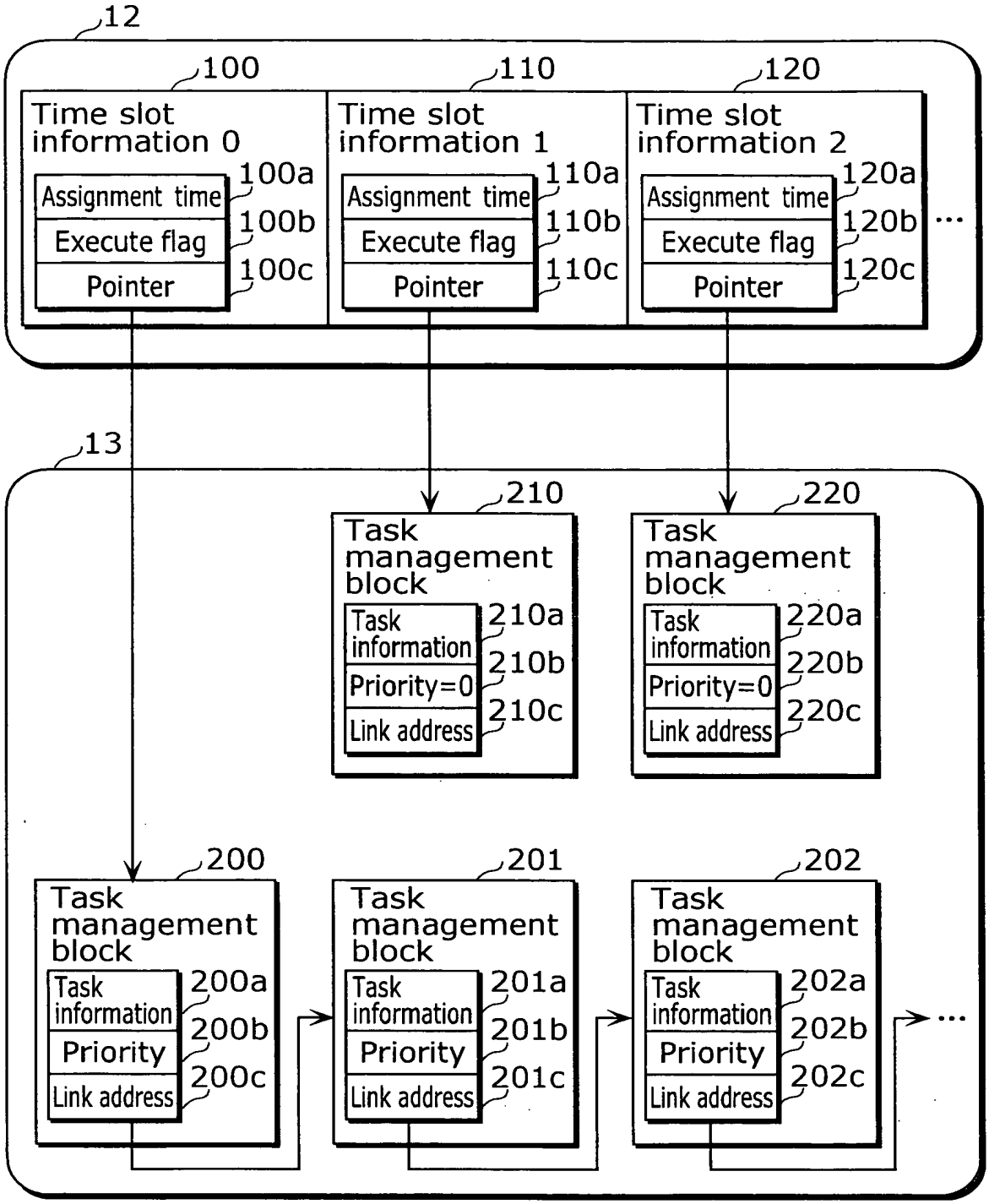

12
100
110
120
Time slot information 0
Time slot information 1
Time slot information 2
Assignment time
Execute flag
Pointer
100a
100b
100c
110a
110b
110c
120a
120b
120c
13
210
220
Task management block
Task information
Priority=0
Link address
210a
210b
210c
220a
220b
220c
200
201
202
Priority
200a
200b
200c
201a
201b
201c
202a
202b
202c

FIG. 3

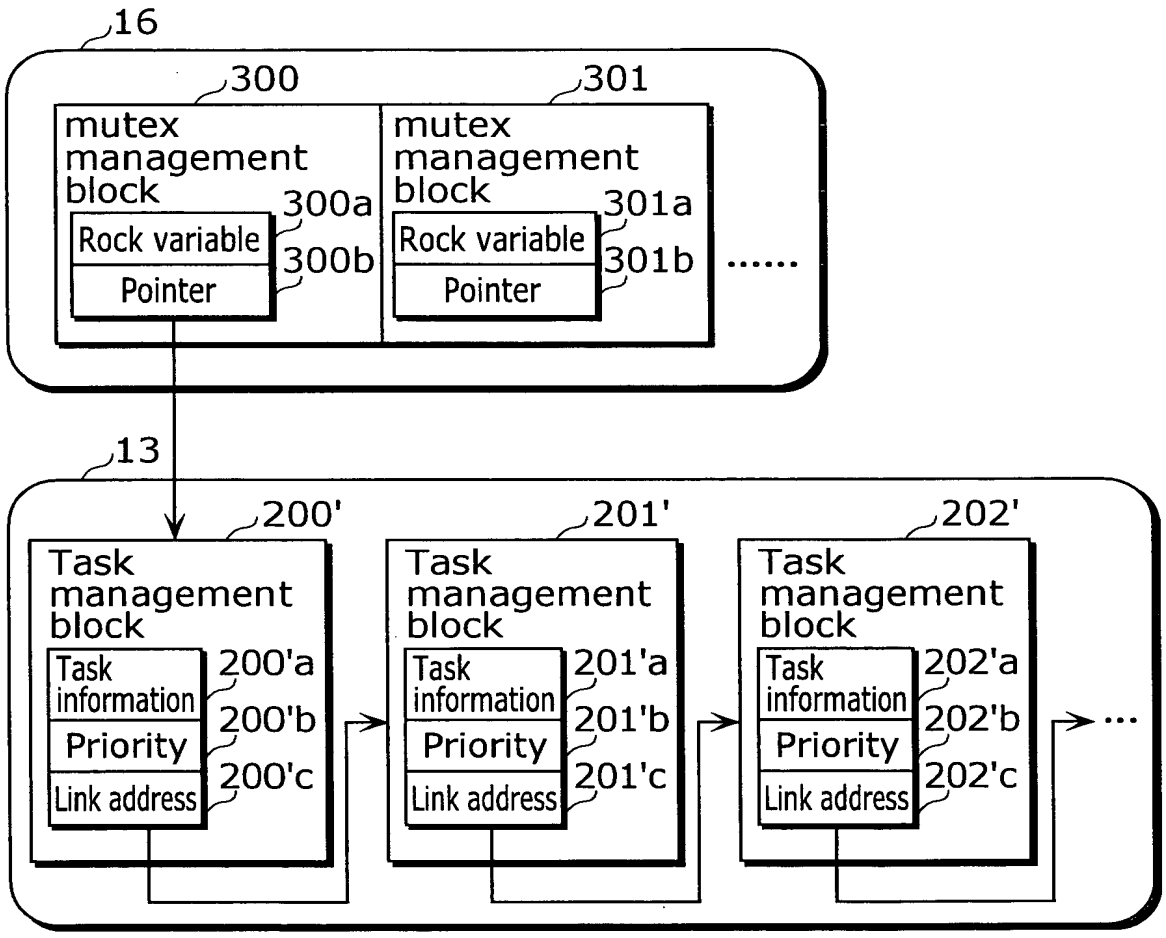

16
300
301
mutex management block
300a
Rock variable
300b
Pointer
mutex management block
301a
Rock variable
301b
Pointer
.....
13
200'
201'
202'
Task management block
Task information
200'a
Priority
200'b
Link address
200'c
Task management block
Task information
201'a
Priority
201'b
Link address
201'c
Task management block
Task information
202'a
Priority
202'b
Link address
202'c
...

FIG. 4

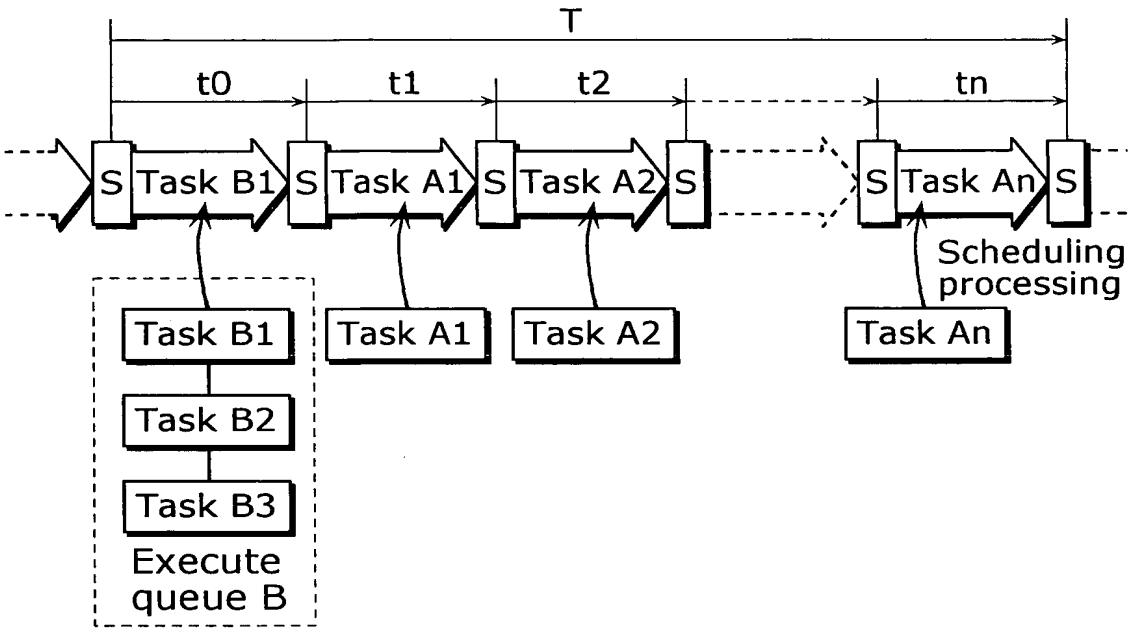

T
t0
t1
t2
tn
S
Task B1
S
Task A1
S
Task A2
S
S
Task An
S
Scheduling processing
Task B1
Task A1
Task A2
Task An
Task B2
Task B3
Execute queue B

FIG. 5

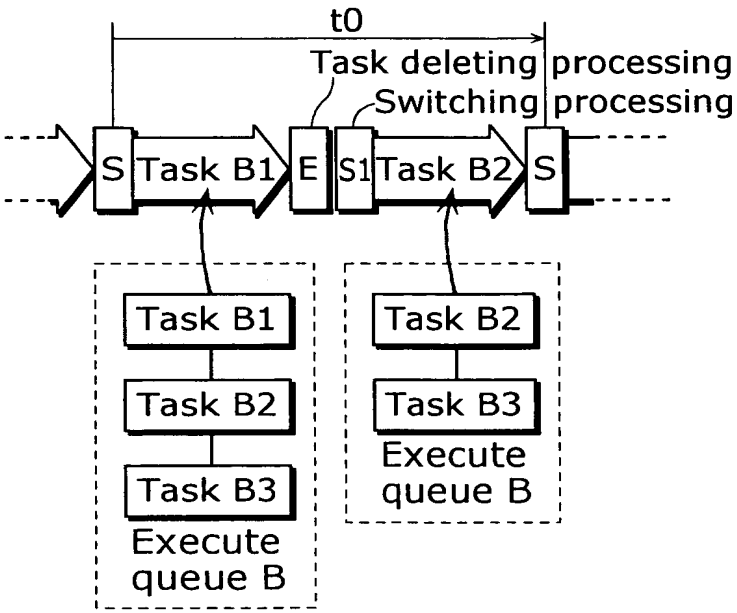

t0
Task deleting processing
Switching processing
S
Task B1
E
S1
Task B2
S
Task B1
Task B2
Task B3
Execute queue B
Task B2
Task B3
Execute queue B

FIG. 6

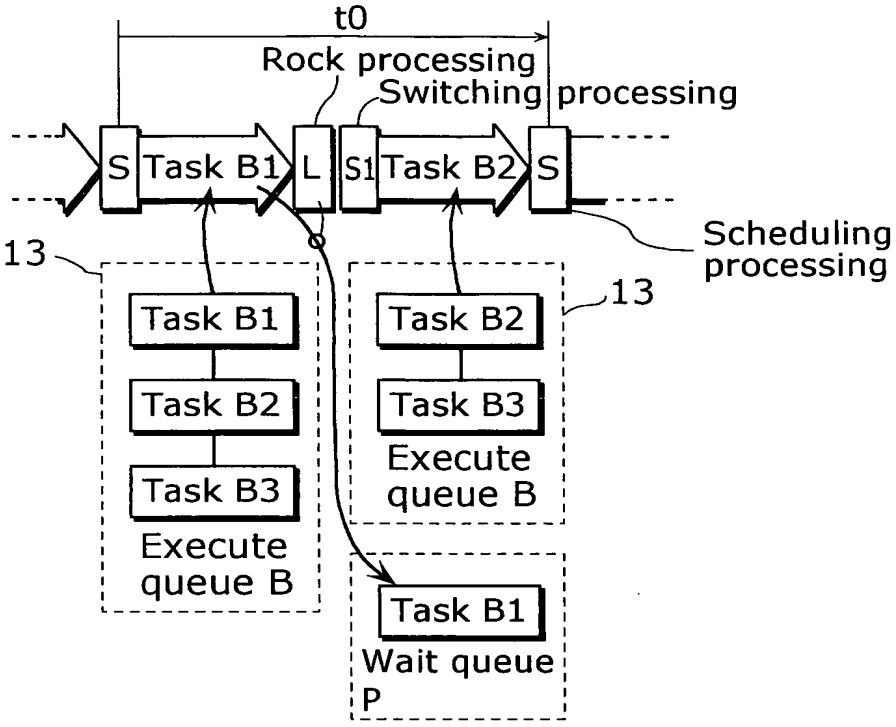

t0
Rock processing
Switching processing
S
Task B1
L
S1
Task B2
S
Scheduling processing
13
Task B1
Task B2
Task B3
Execute queue B
13
Task B2
Task B3
Execute queue B
Task B1
Wait queue P

FIG. 7

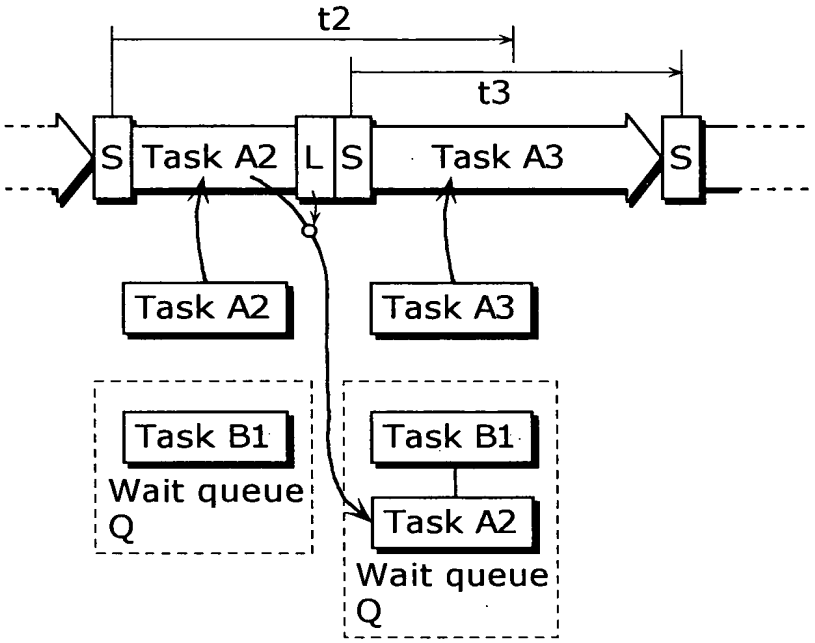

t2
t3
S
Task A2
L
S
Task A3
S
Task A2
Task A3
Task B1
Wait queue Q
Task B1
Task A2
Wait queue Q

FIG. 8

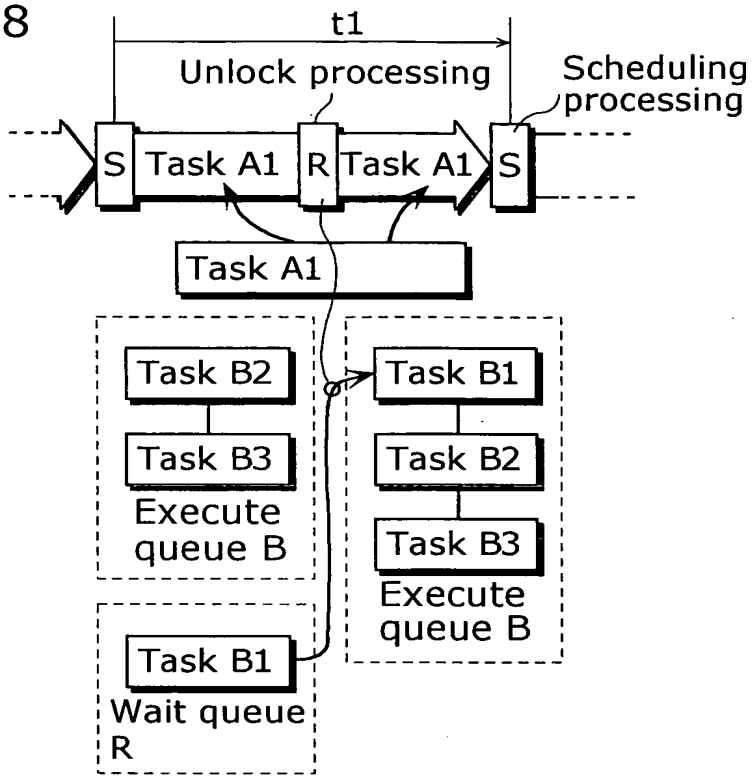

t1
Unlock processing
Scheduling processing
S
Task A1
R
Task A1
S
Task A1
Task B2
Task B3
Execute queue B
Task B1
Task B2
Task B3
Execute queue B
Task B1
Wait queue R

FIG. 9

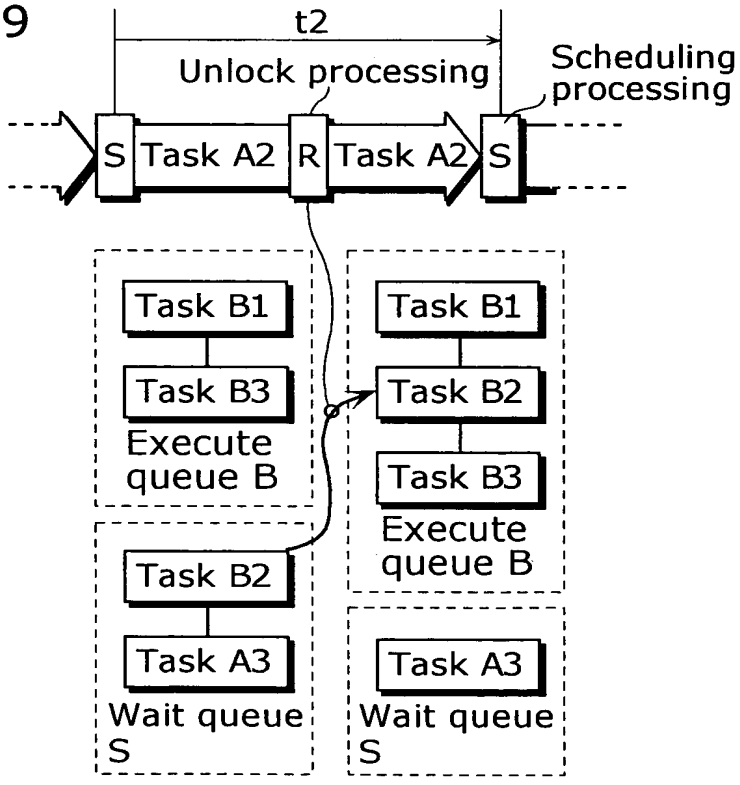

t2
Unlock processing
Scheduling processing
S
Task A2
R
Task A2
S
Task B1
Task B3
Execute queue B
Task B1
Task B2
Task B3
Execute queue B
Task B2
Task A3
Wait queue S
Task A3
Wait queue S

FIG. 10

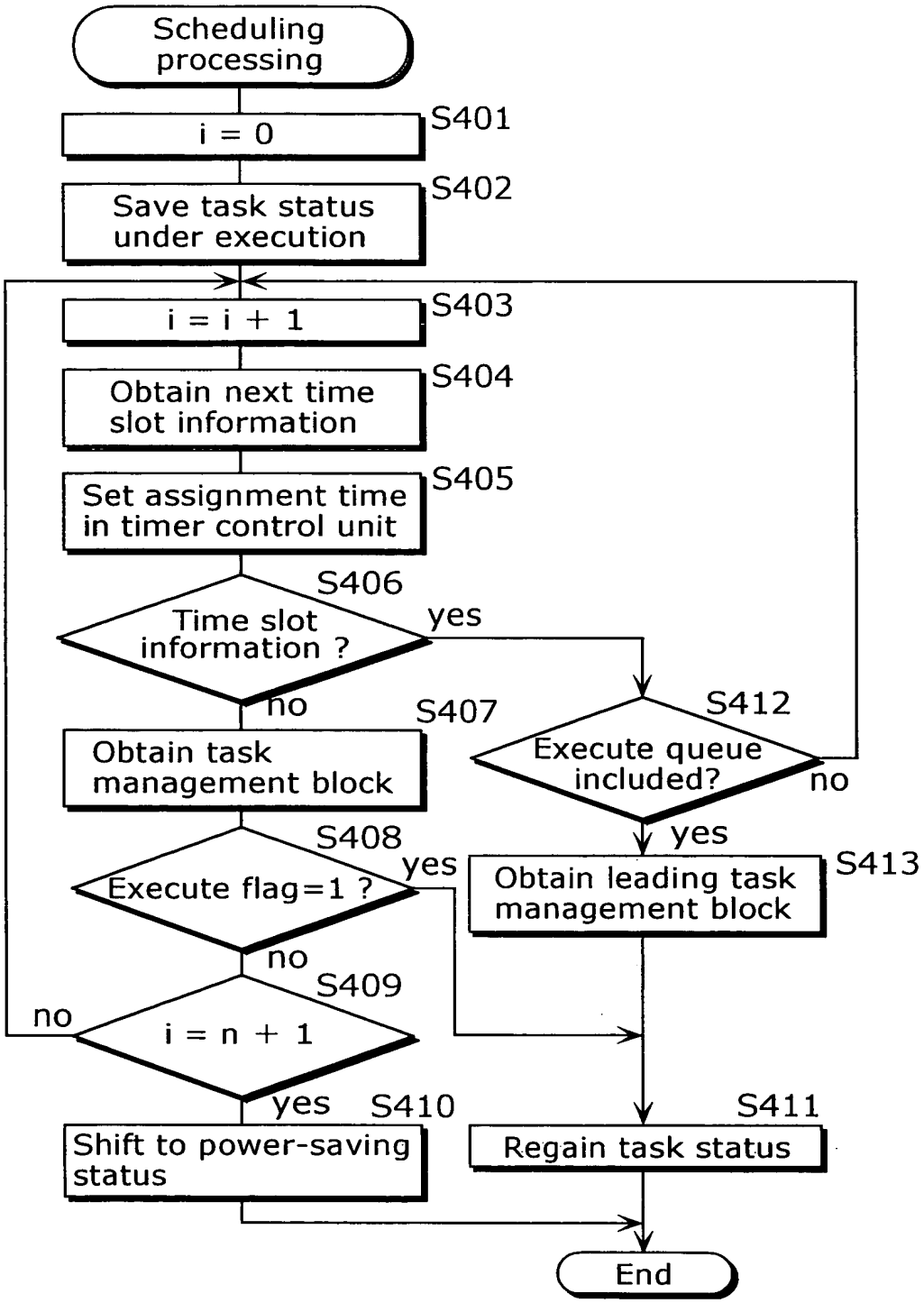

Scheduling processing
i = 0
S401
Save task status under execution
S402
i = i + 1
S403
Obtain next time slot information
S404
Set assignment time in timer control unit
S405
S406
Time slot information ?
yes
no
S407
Obtain task management block
S408
Execute flag=1 ?
yes
no
S409
i = n + 1
no
yes
S410
Shift to power-saving status
S412
Execute queue included?
no
yes
S413
Obtain leading task management block
S411
Regain task status
End

FIG. 11

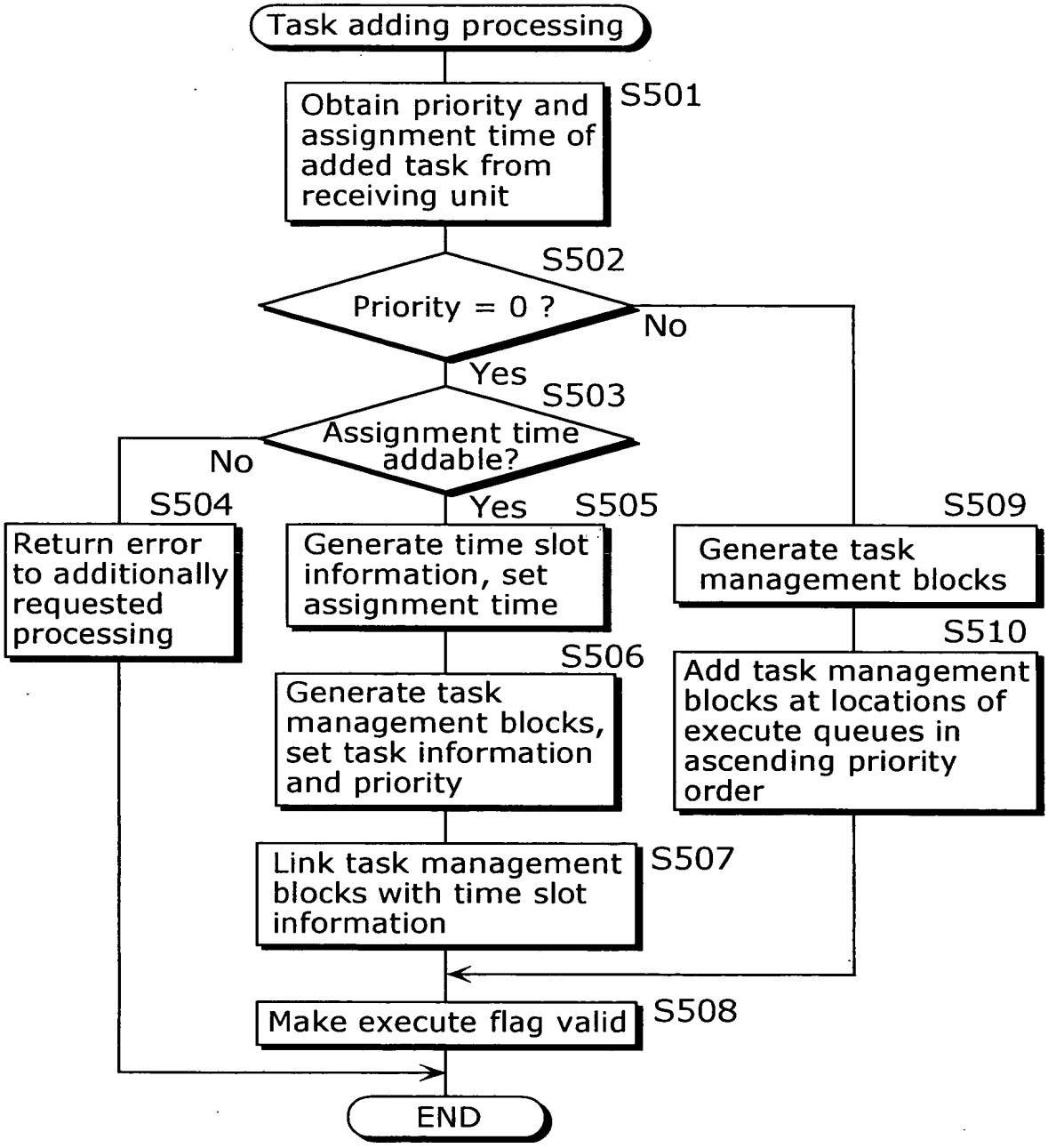

Task adding processing
Obtain priority and assignment time of added task from receiving unit
S501
S502
Priority = 0 ?
No
Yes
S503
Assignment time addable?
No
Yes
S504
Return error to additionally requested processing
S505
Generate time slot information, set assignment time
S506
Generate task management blocks, set task information and priority
Link task management blocks with time slot information
S507
S509
Generate task management blocks
S510
Add task management blocks at locations of execute queues in ascending priority order
Make execute flag valid
S508
END

FIG. 12

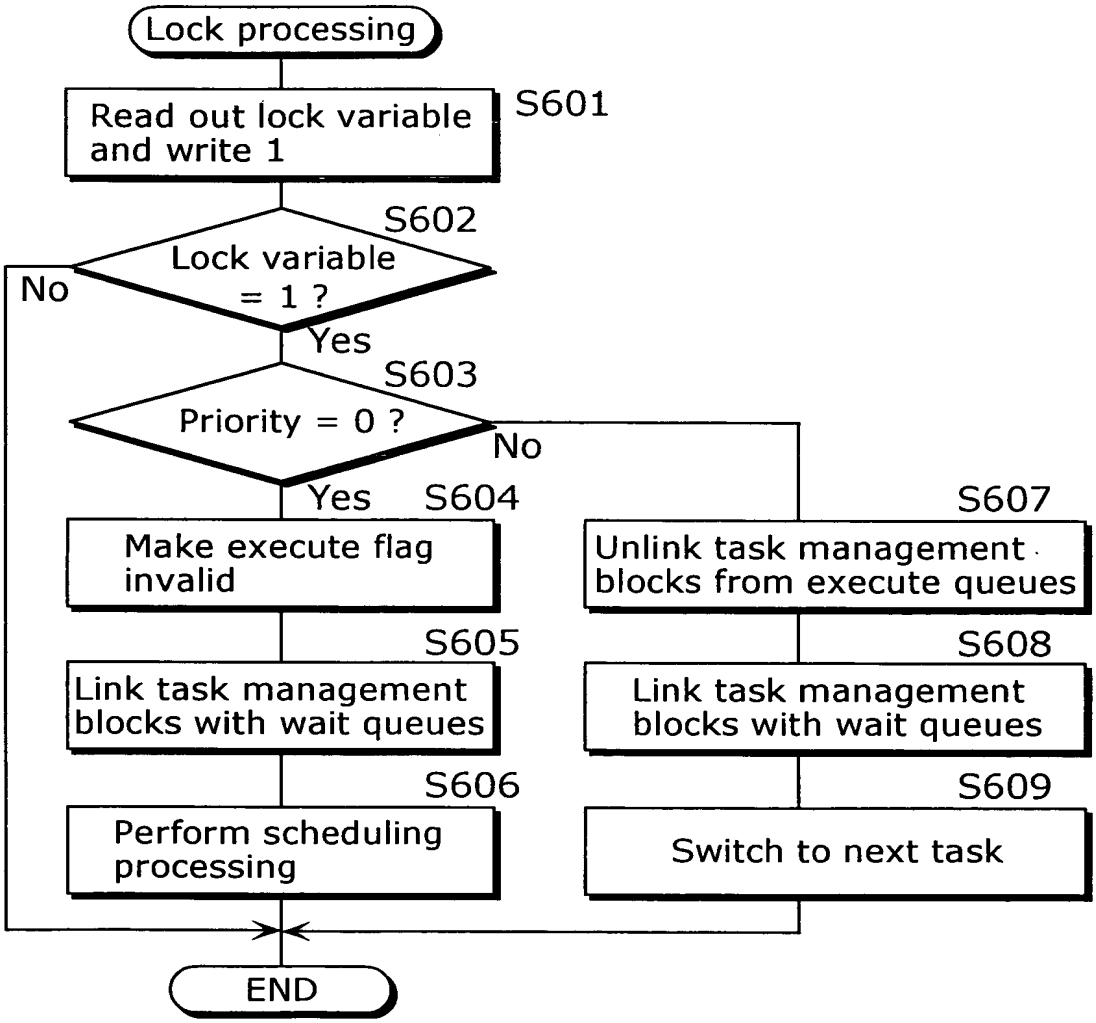

Lock processing
Read out lock variable and write 1
S601
S602
Lock variable = 1 ?
No
Yes
S603
Priority = 0 ?
No
Yes
S604
Make execute flag invalid
S605
Link task management blocks with wait queues
S606
Perform scheduling processing
S607
Unlink task management blocks from execute queues
S608
Link task management blocks with wait queues
S609
Switch to next task
END

FIG. 13

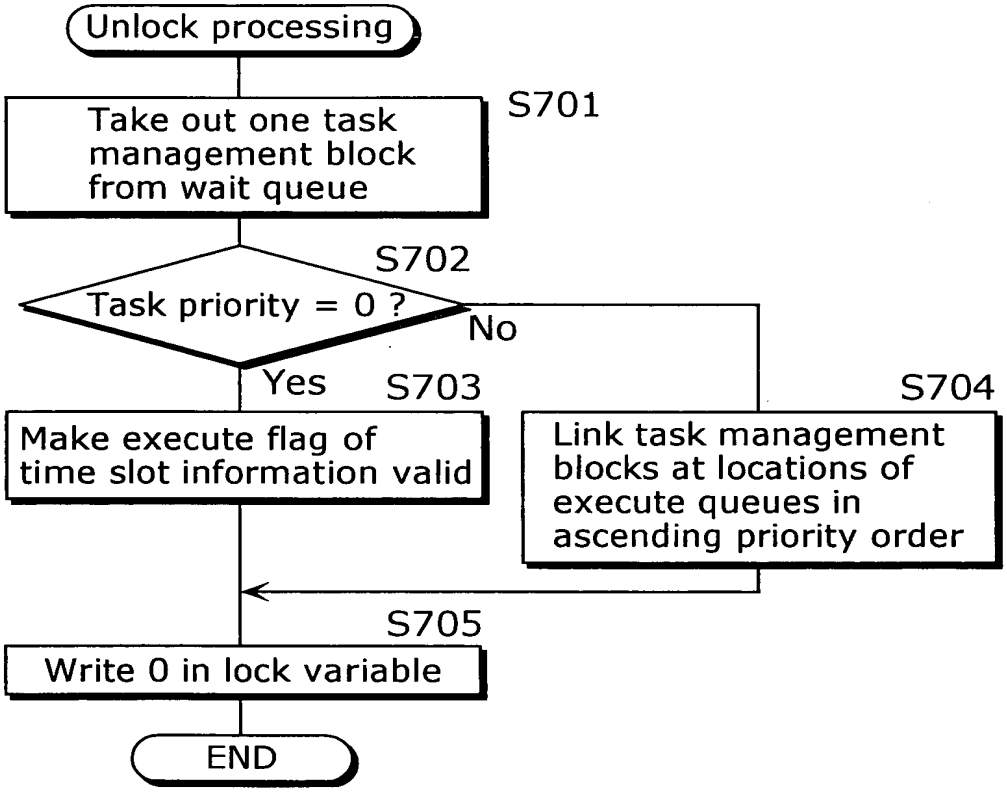
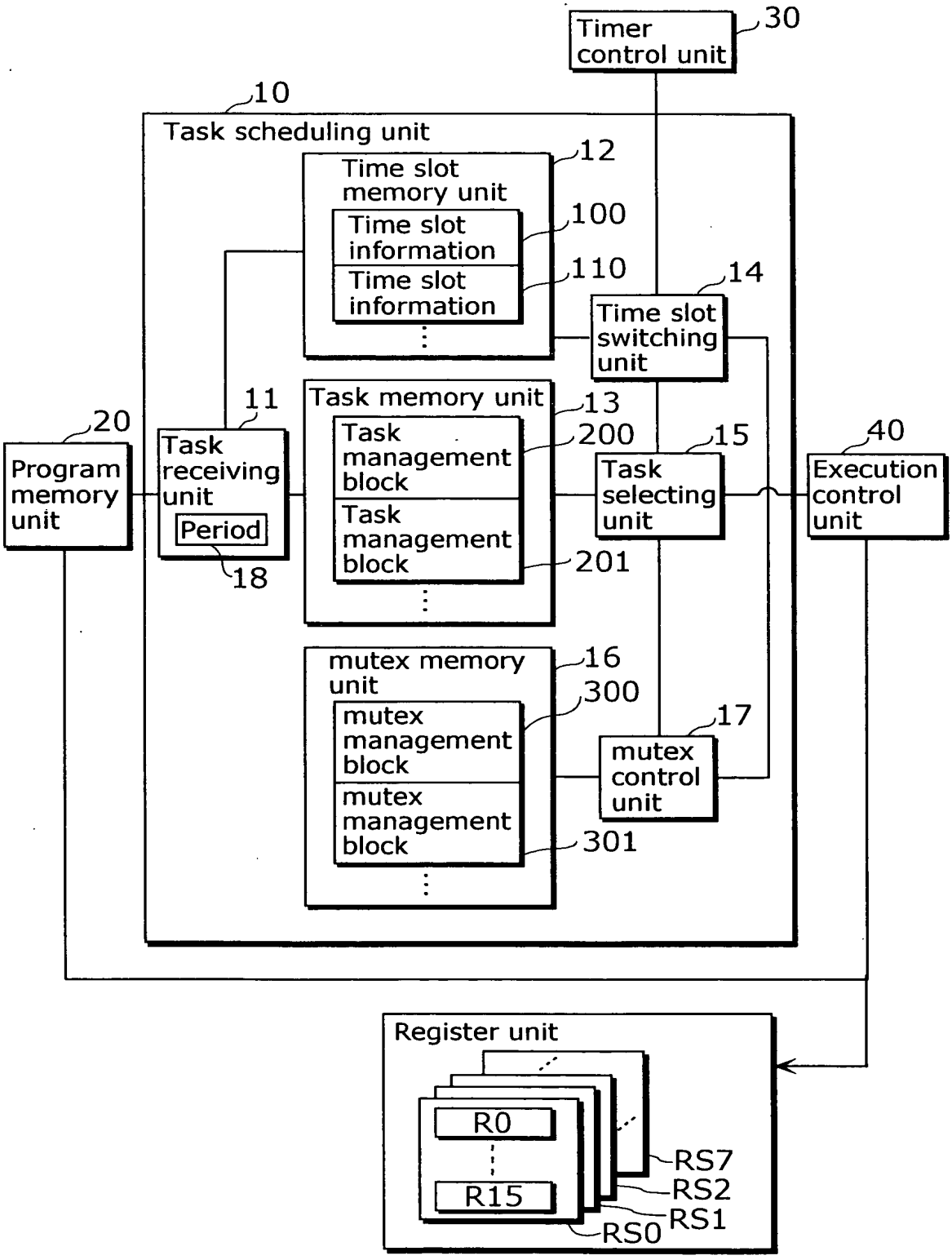

Unlock processing
Take out one task management block from wait queue
S701
Task priority = 0 ?
S702
No
Yes
S703
Make execute flag of time slot information valid
S704
Link task management blocks at locations of execute queues in ascending priority order
S705
Write 0 in lock variable
END

FIG. 14


Timer control unit
30
10
Task scheduling unit
12
Time slot memory unit
100
Time slot information
110
Time slot information
14
Time slot switching unit
11
Task memory unit
13
20
Task receiving unit
Period
18
Task management block
200
15
40
Program memory unit
Task selecting unit
Execution control unit
Task management block
201
mutex memory unit
16
300
mutex management block
17
mutex control unit
mutex management block
301
Register unit
R0
R15
RS7
RS2
RS1
RS0